

Veterinary Infectious Diseases, New Technologies, and the Future

International
Biosecurity
Symposium

Sandia National Laboratories

Keith Murray – February 2, 2004

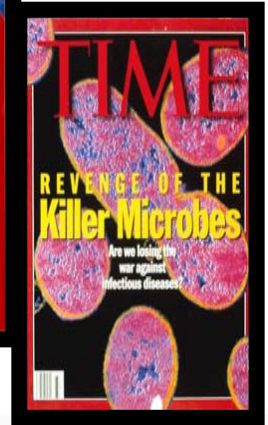
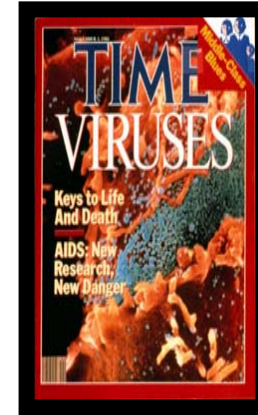


Drivers for Change

1. Globalization of Disease



2. Public Concern



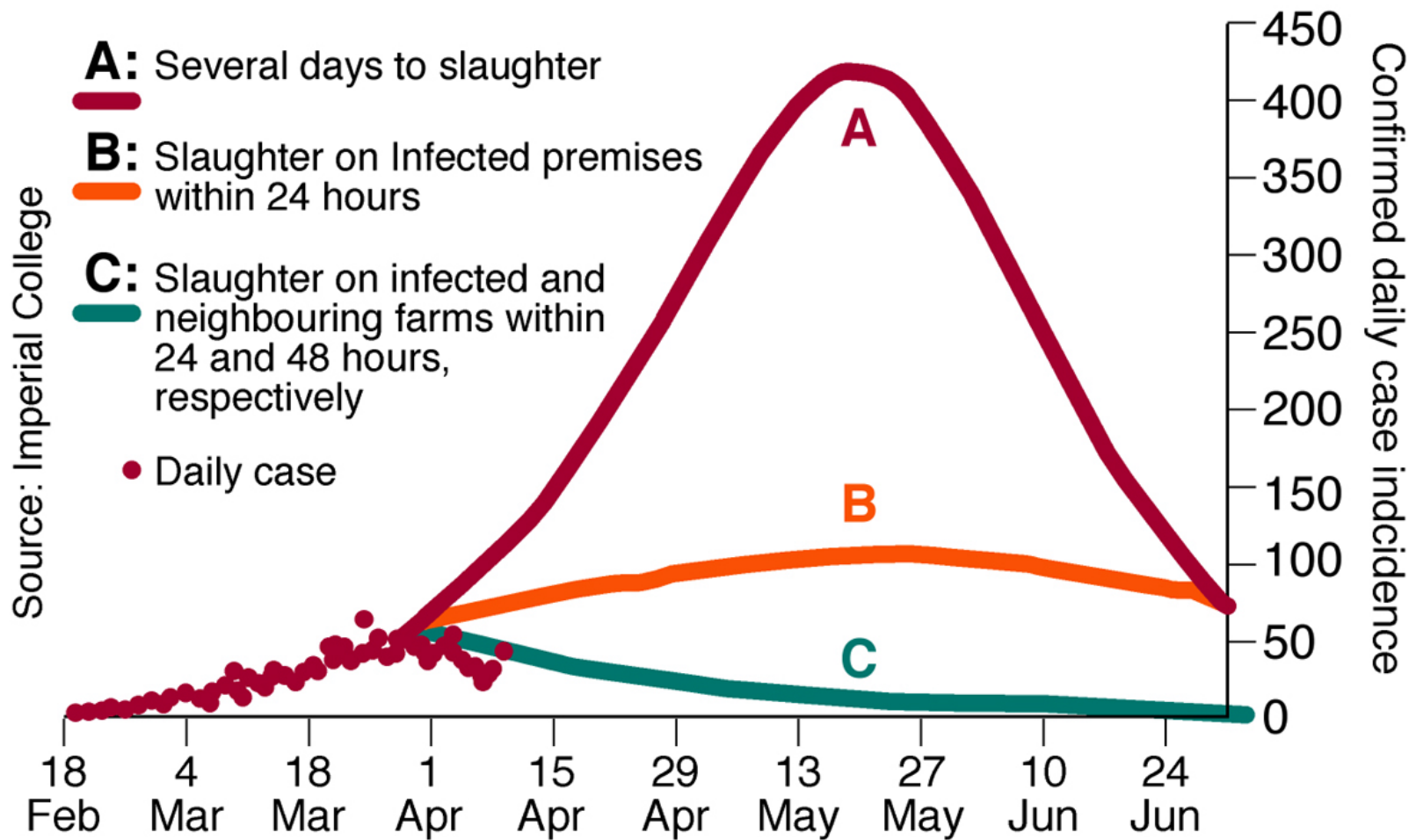
3. New Technology Biotechnology and Information Technology



4. Homeland Security



How Slaughtering Can Contain The Outbreak

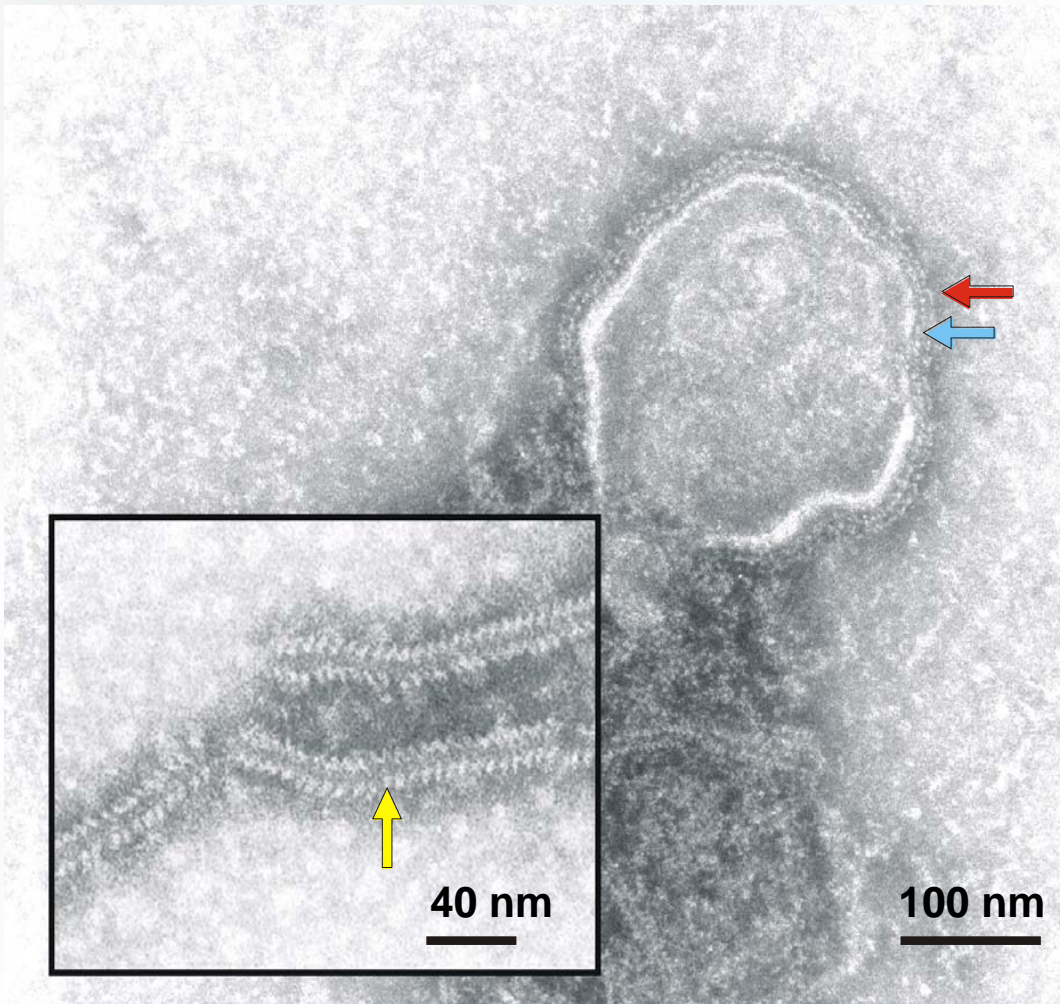


HENDRA VIRUS

ULTRASTRUCTURAL

CHARACTERISTICS

- Size: 40 nm to > 600 nm.
- Nucleocapsid: 18 nm ←
- Periodicity of serrations: 5 nm
- Surface projections
 - Outer: 15 nm ←
 - Inner: 8 nm ←
- Intracellular location.
 - Virus buds at plasma membrane.
 - Aggregates of nucleocapsids in the cytoplasm. No intranuclear aggregates observed.



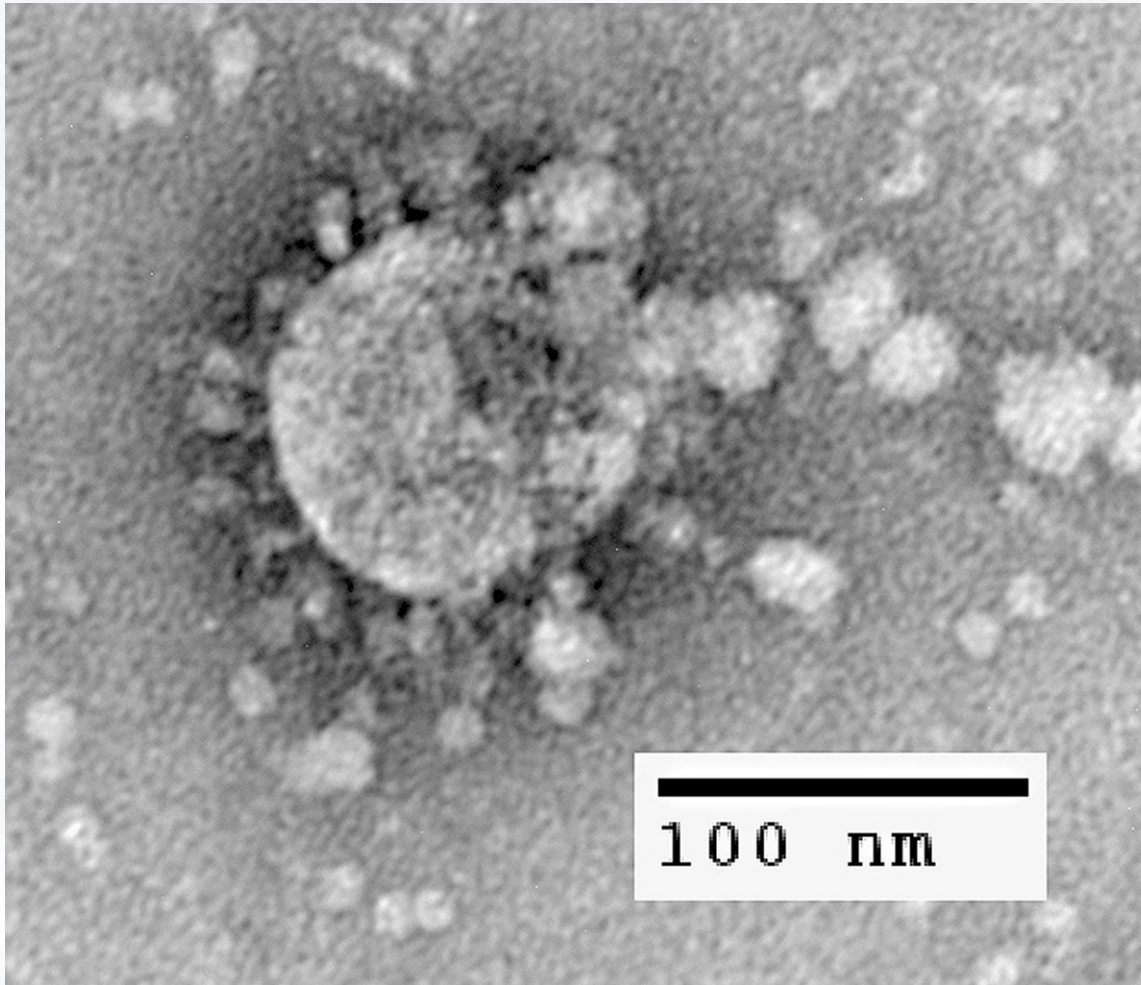






Nipah Field Investigations - Malaysia

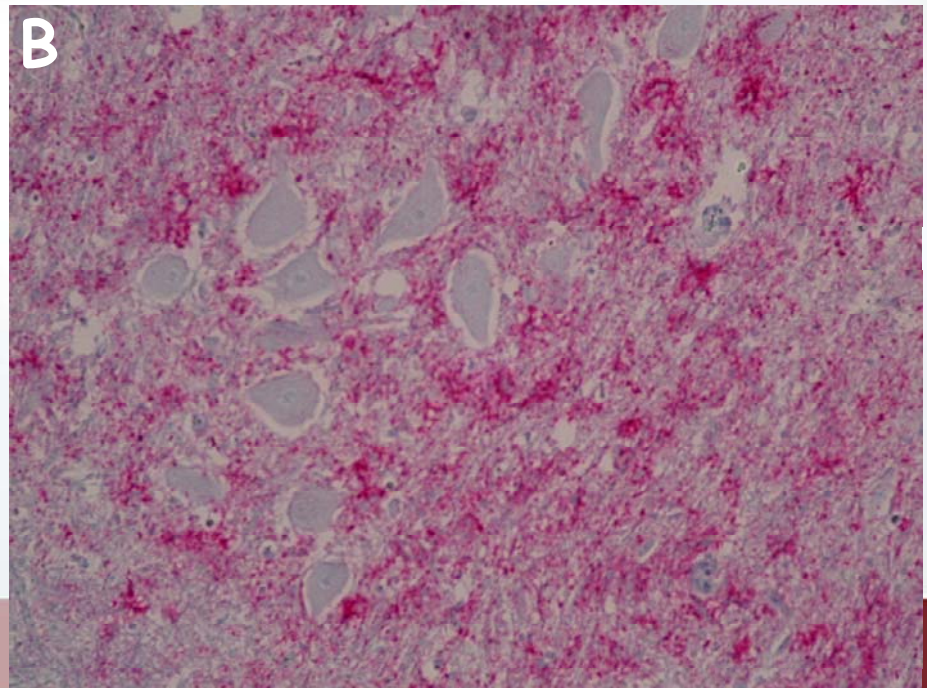
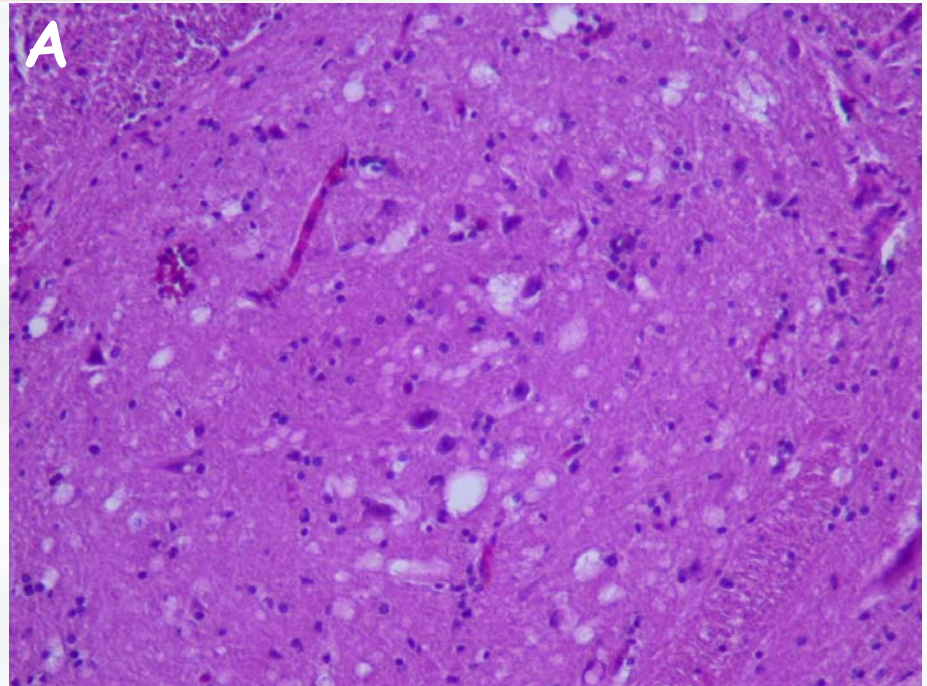




Coronavirus
Particle by
Negative Stain
EM
(Isolate From
Patient With
SARS)

Obex-area from U.S. BSE case

- A. Histopathology: H&E stain
- B. Immunohistochemistry:
anti-PrP antibody



**Kluge, Davis, and Hall (NVSL-APHIS-
USDA), unpublished results**



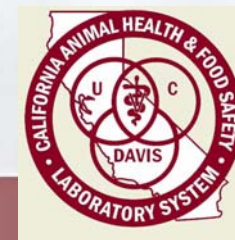
VIRUS ISOLATION



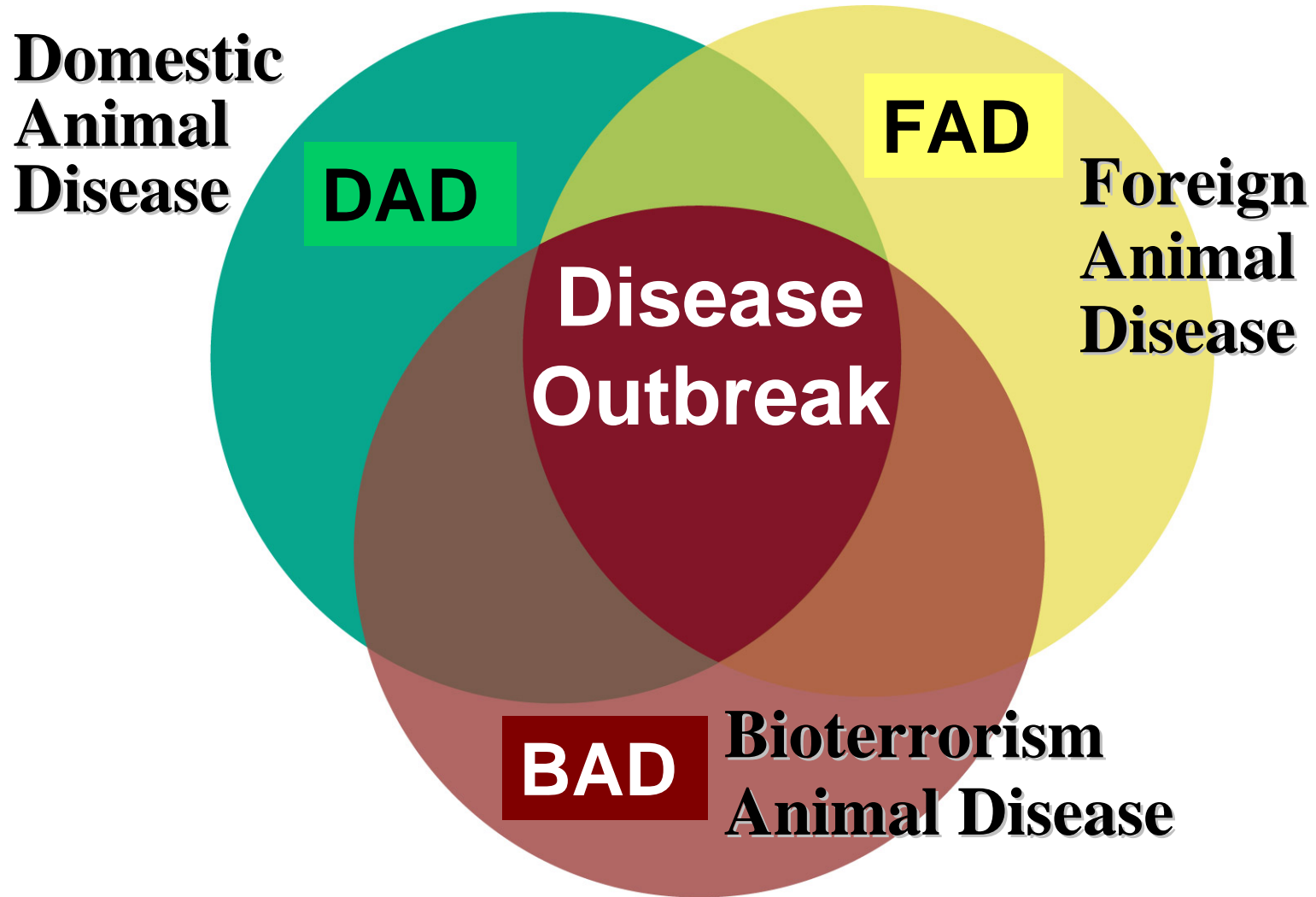
CAHFS – San Bernardino

CAHFS – Fresno

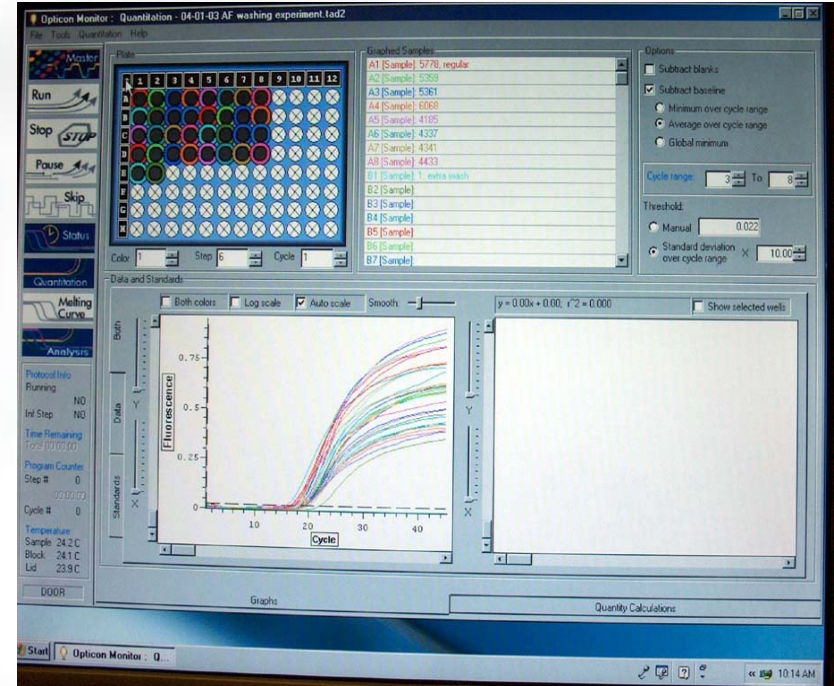
NVSL



Animal Diseases: The Compartments



96-well RRT-PCR



MJ Inc, 96-well Opticon Reader

0.5 hour Reverse Transcription, 1.5 hour amplification + detection



RAPID and RAZOR

Idaho Technologies

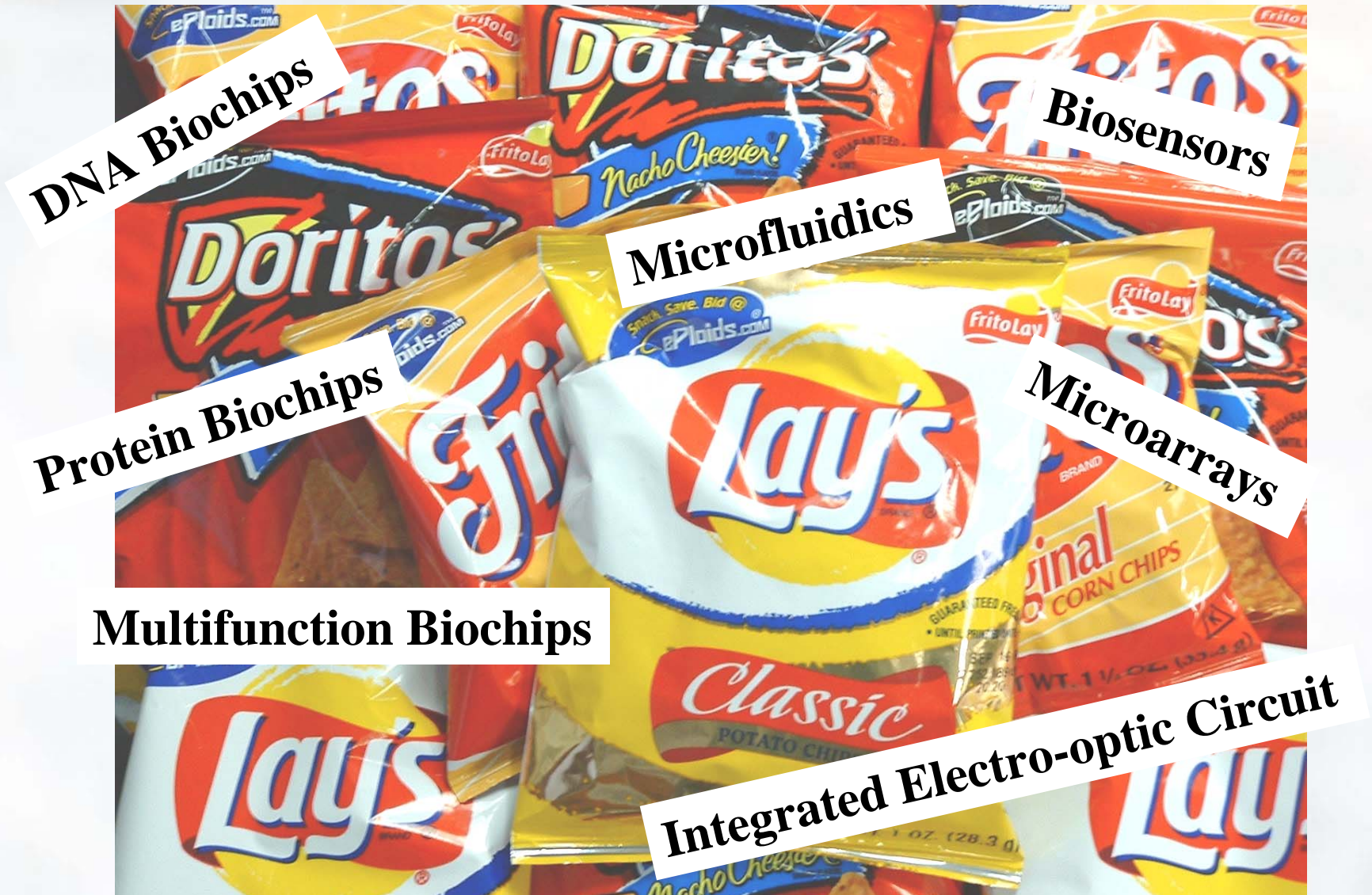


**Ruggedized Advanced
Pathogen Identification
Device (RAPID)**
Results in Under 30 Minutes
RNA-detection: +45 min

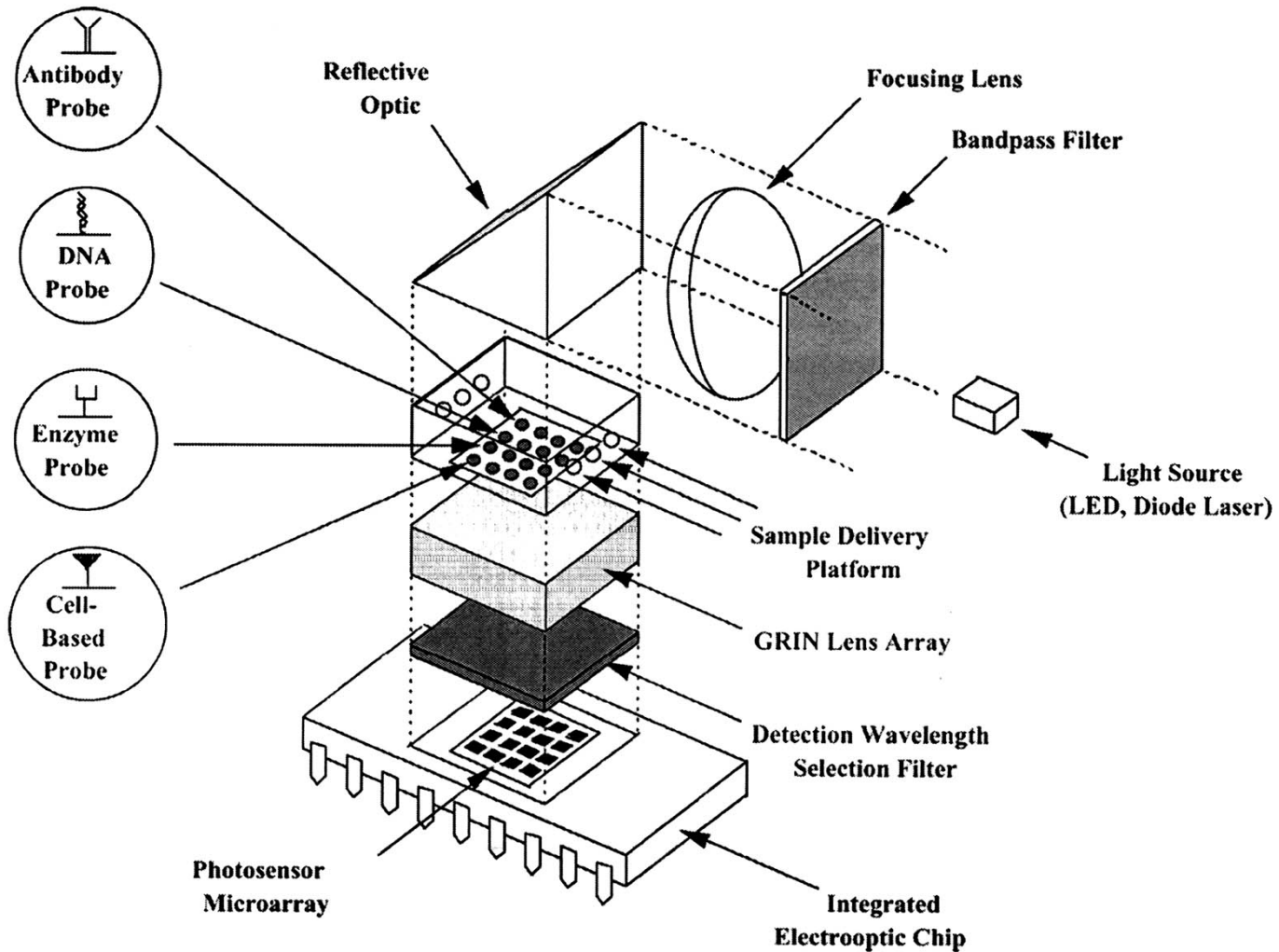


RAZOR
**Latest Handheld
Device**

The Future...Chips!!



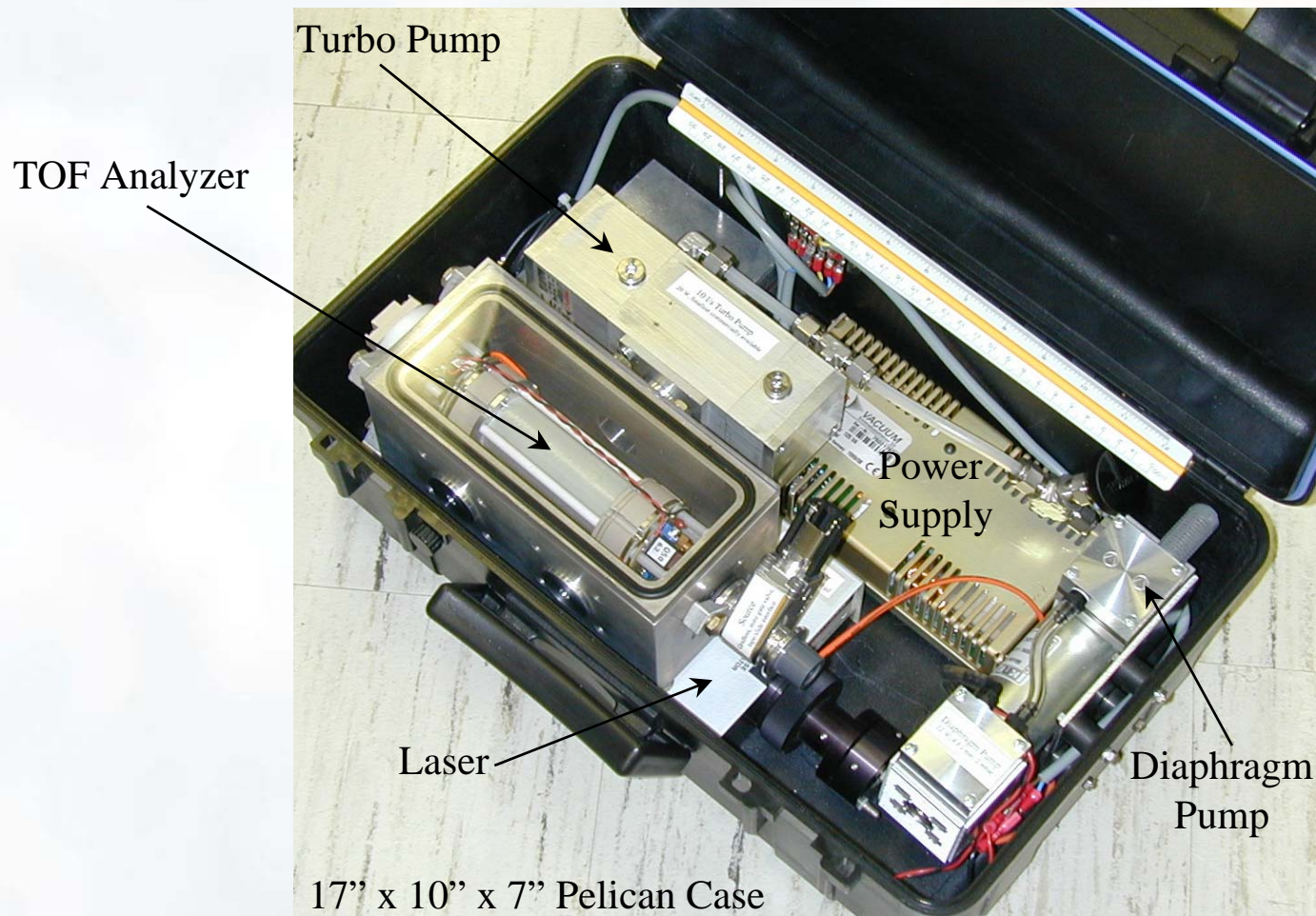
Diagnostic Biochip



Suitcase TOF-MS

(POCs: Richard Benson & Scott Ecelberger)

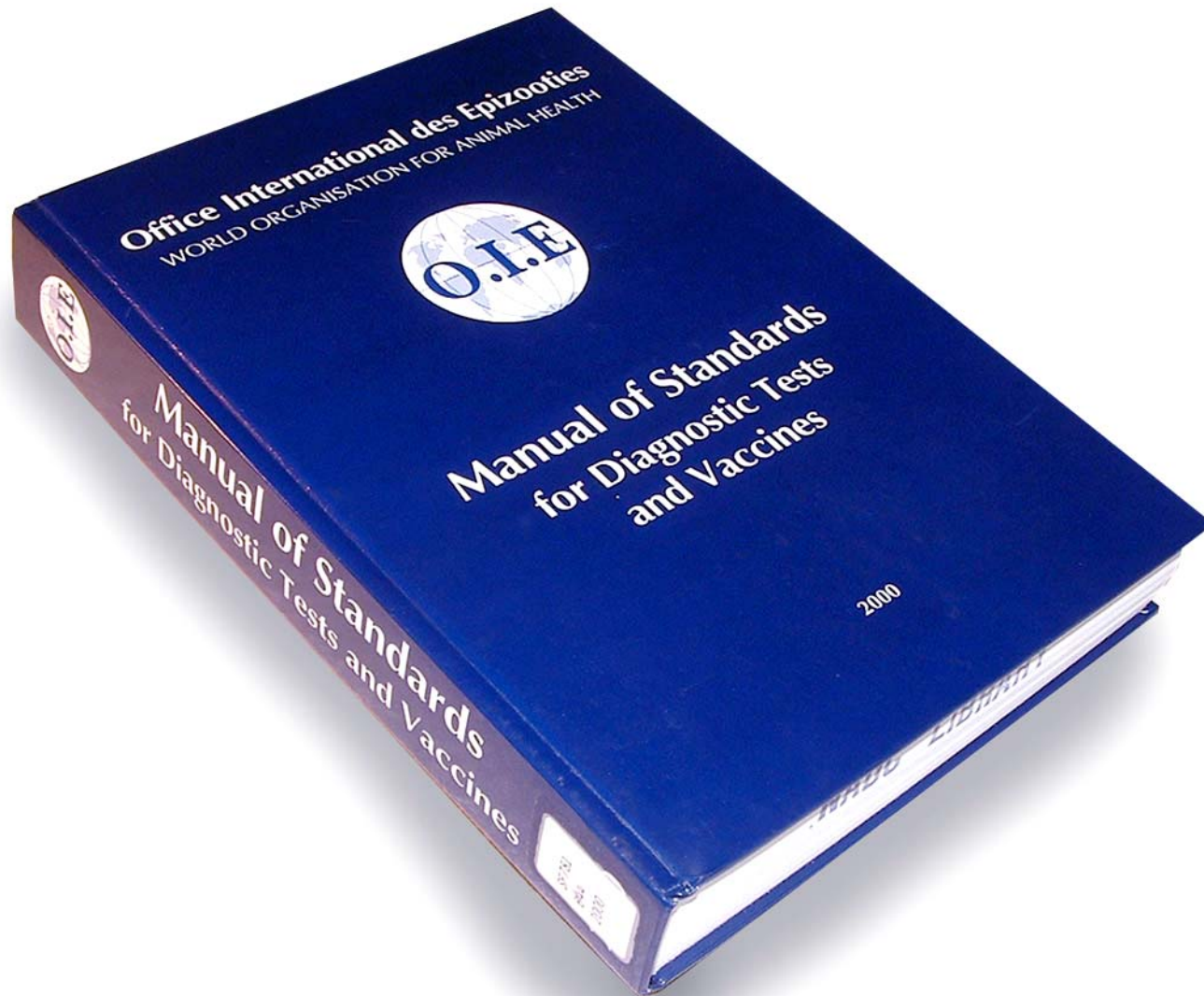
Suitcase TOF-MS in a Small Pelican Case



Diagnostic Test Applications

- **Individual Animal Diagnosis**
- **Herd Diagnosis and Monitoring (for control/eradication)**
- **Surveillance**
- **Certification for Trade**

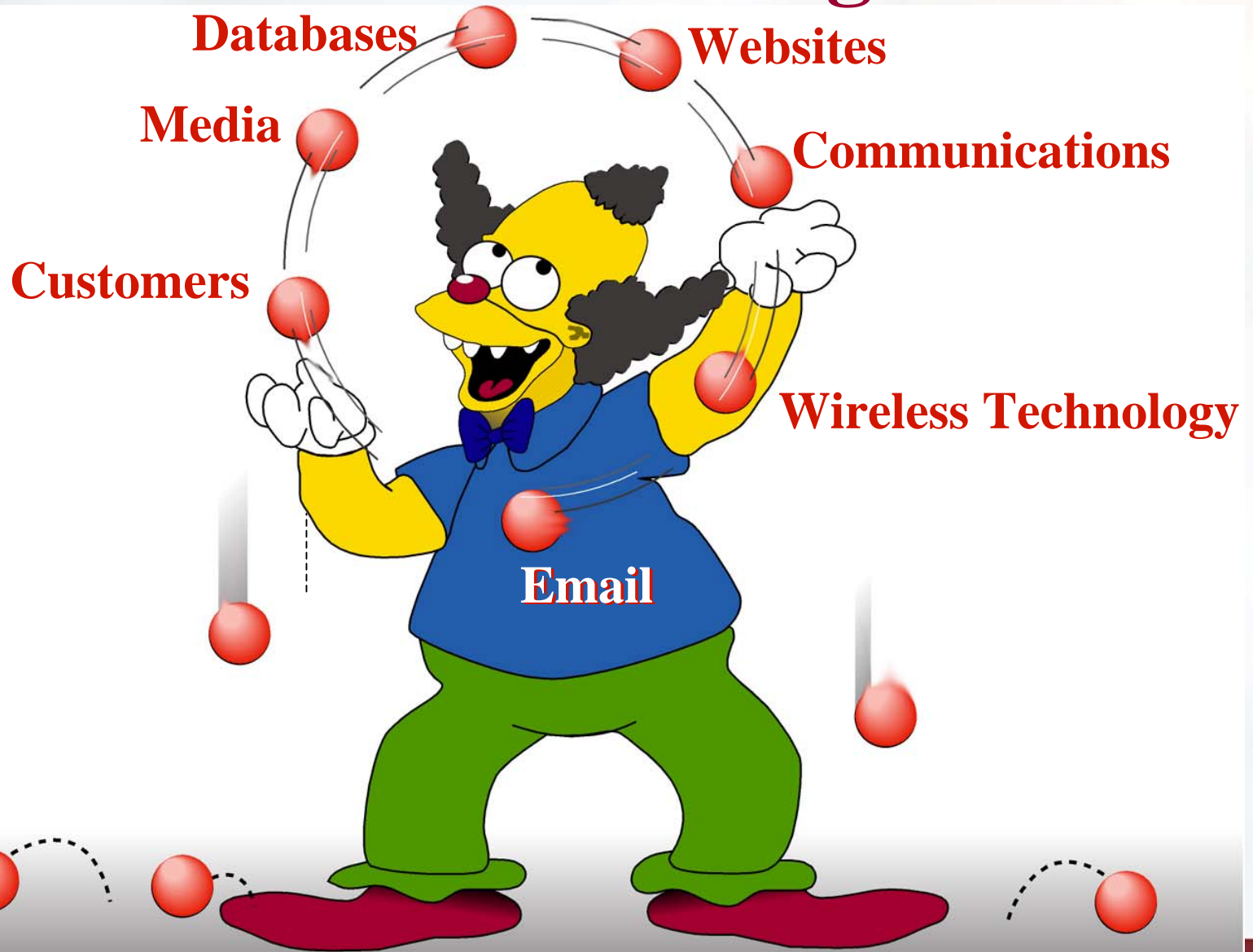
Diagnostic Quality Standards



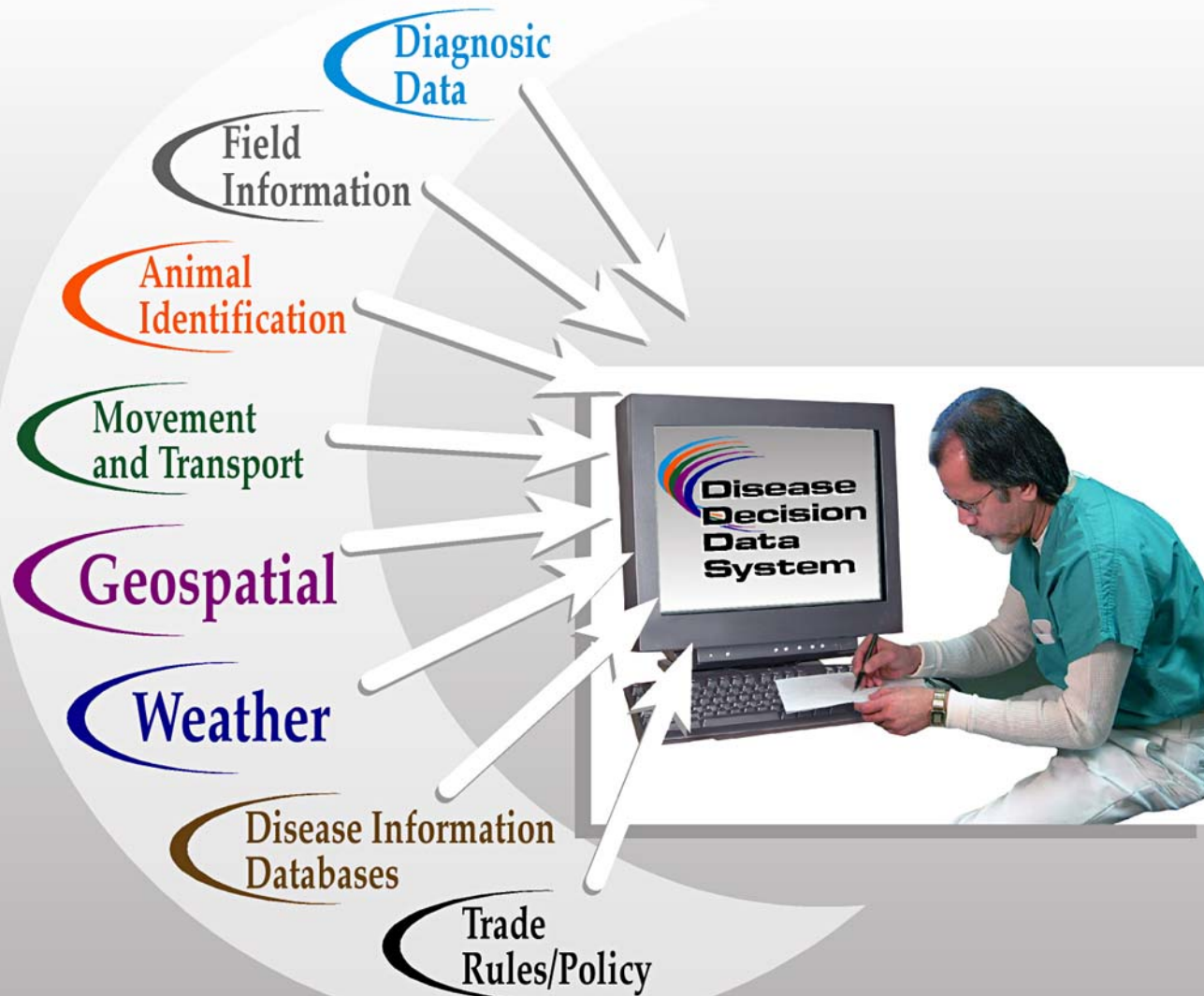
OIE Test Validation Stages

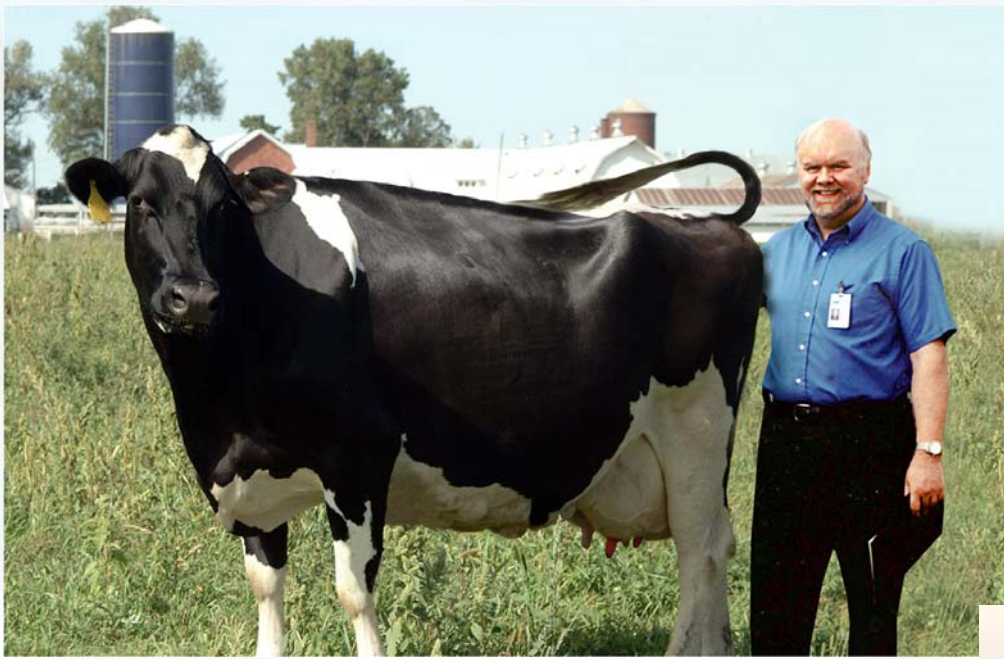
1. Feasibility	Laboratory
2. Development and Standardization	Test Animals
3. Characterization of Assay Performance	Field DSN DSP
4. Monitoring and Refinement	Field

Information Management



Disease Decision System





The Way it Was...

The Way it Will Be

